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2D stellar kinematics of nuclear bars

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Abstract. We just started an observational program to obtain 2D kinematics of nuclear bars, to be compared to N body simulations of single and double-barred galaxies.

We have started a program to study the kinematics of double-barred galaxies using the Integral Field Spectrograph `OASIS` (CFHT). Stellar bidimensional velocity fields obtained with OASIS are compared with N body + SPH simulations, to constrain the characteristics of the primary and secondary bars (e.g. the pattern speed, Friedli & Martinet 1993). We intend to confirm that the secondary bars observed photometrically (e.g. Wozniak et al. 1995) are truly decoupled systems.

In this paper, we present preliminary results on two prototypical double-barred galaxies: NGC 3504, which exhibits nearly aligned primary and secondary bars, and NGC 5850, in which the two bar components are almost orthogonal to each other.

There is a hint of the presence of an $m = 1$ mode in the nuclear bar of NGC 3504, already observed in AOB images obtained by Combes et al. (PUEO/CFHT). We also accidentally observed a Supernova (1998cf, IAUC 6914) at $\sim 6''$. from the centre of the galaxy (see Fig. 1). In NGC 5850, the OASIS data show that the kinematical minor-axis of the secondary bar nearly coincides with the photometric minor-axis of the primary.

In these two objects, the zero velocity curve of the nuclear bar is close to the photometric minor-axis of the *primary* bar. Single-barred galaxy models failed to reproduce the observed kinematics. Although this seems counter-intuitive, our OASIS observations are perfectly consistent with N body simulations of double-barred galaxies performed by Friedli (see also Leon et al., these Proceedings).

A larger sample of double-barred galaxies is going to be observed with OASIS including both the gaseous and stellar kinematics.

References

Friedli, D., Martinet, L., 1993, A&A, 277, 27

Wozniak, H., Friedli, D., Martinet, L., Martin, P., Bratschi, P., 1995, A&AS, 111, 115

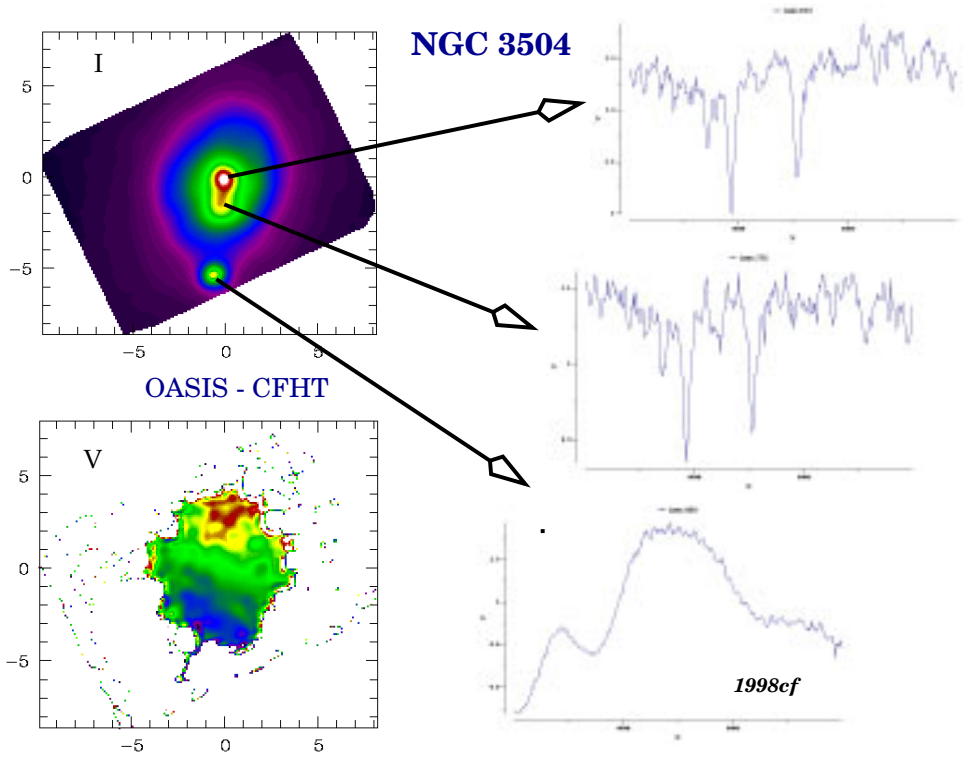
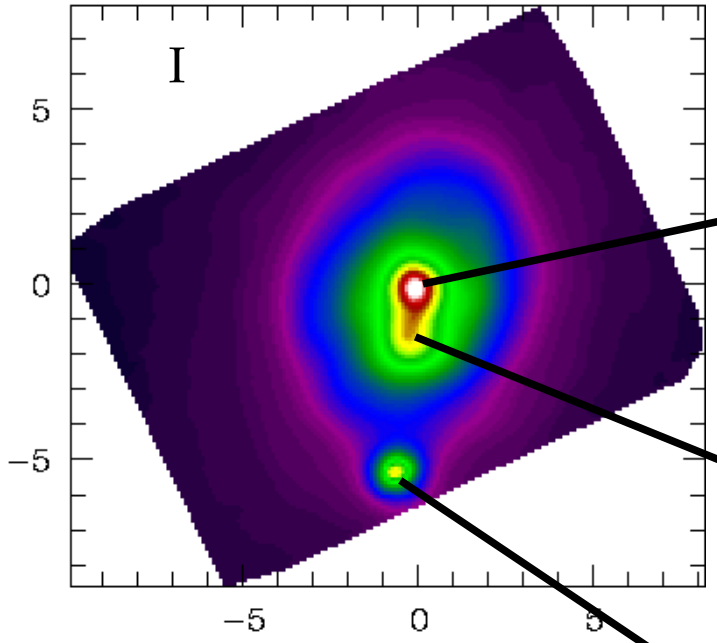


Figure 1. OASIS data of NGC 3504: stellar continuum (I band) reconstructed image (top left), stellar velocity field (bottom left) and three spectra at different locations on the field of view. The spectrum at the bottom corresponds to the peak of the detected supernova, and exhibits broad Ca lines in emission.

NGC 3504



OASIS - CFHT